Multiple Intelligences

Howard Gardner of Harvard has identified seven distinct intelligences. This theory has emerged from recent cognitive research and "documents the extent to which students possess different kinds of minds and therefore learn, remember, perform, and understand in different ways," according to Gardner (1991). According to this theory, "we are all able to know the world through language, logical-mathematical analysis, spatial representation, musical thinking, the use of the body to solve problems or to make things, an understanding of other individuals, and an understanding of ourselves. Where individuals differ is in the strength of these intelligences - the so-called profile of intelligences -and in the ways in which such intelligences are invoked and combined to carry out different tasks, solve diverse problems, and progress in various domains."

Gardner says that these differences "challenge an educational system that assumes that everyone can learn the same materials in the same way and that a uniform, universal measure suffices to test student learning. Indeed, as currently constituted, our educational system is heavily biased toward linguistic modes of instruction and assessment and, to a somewhat lesser degree, toward logical-quantitative modes as well." Gardner argues that "a contrasting set of assumptions is more likely to be educationally effective. Students learn in ways that are identifiably distinctive. The broad spectrum of students - and perhaps the society as a whole - would be better served if disciplines could be presented in a numbers of ways and learning could be assessed through a variety of means." The learning styles are as follows:

Visual-Spatial - think in terms of physical space, as do architects and sailors. Very aware of their environments. They like to draw, do jigsaw puzzles, read maps, daydream. They can be taught through drawings, verbal and physical imagery. Tools include models, graphics, charts, photographs, drawings, 3-D modeling, video, videoconferencing, television, multimedia, texts with pictures/charts/graphs.

Bodily-kinesthetic - use the body effectively, like a dancer or a surgeon. Keen sense of body awareness. They like movement, making things, touching. They communicate well through body language and be taught through physical activity, hands-on learning, acting out, role playing. Tools include equipment and real objects.

Musical - show sensitivity to rhythm and sound. They love music, but they are also sensitive to sounds in their environments. They may study better with music in the background. They can be taught by turning lessons into lyrics, speaking rhythmically, tapping out time. Tools include musical instruments, music, radio, stereo, CD-ROM, multimedia.

Interpersonal - understanding, interacting with others. These students learn through interaction. They have many friends, empathy for others, street smarts. They can be taught through group activities, seminars, dialogues. Tools include the telephone, audio conferencing, time and attention from the instructor, video conferencing, writing, computer conferencing, E-mail.

Intrapersonal - understanding one's own interests, goals. These learners tend to shy away from others. They're in tune with their inner feelings; they have wisdom, intuition and motivation, as well as a strong will, confidence and opinions. They can be taught through independent study and introspection. Tools include books, creative materials, diaries, privacy and time. They are the most independent of the learners.

Linguistic - using words effectively. These learners have highly developed auditory skills and often think in words. They like reading, playing word games, making up poetry or stories. They can be taught by encouraging them to say and see words, read books together. Tools include computers, games, multimedia, books, tape recorders, and lecture.

Logical -Mathematical - reasoning, calculating. Think conceptually, abstractly and are able to see and explore patterns and relationships. They like to experiment, solve puzzles, ask cosmic questions. They can be taught through logic games, investigations, mysteries. They need to learn and form concepts before they can deal with details.

At first, it may seem impossible to teach to all learning styles. However, as we move into using a mix of media or multimedia, it becomes easier. As we understand learning styles, it becomes apparent why multimedia appeals to learners and why a mix of media is more effective. It satisfies the many types of learning preferences that one person may embody or that a class embodies. A review of the literature shows that a variety of decisions must be made when choosing media that is appropriate to learning style.

Visuals: Visual media help students acquire concrete concepts, such as object identification, spatial relationship, or motor skills where words alone are inefficient.

Printed words: There is disagreement about audio's superiority to print for affective objectives; several models do not recommend verbal sound if it is not part of the task to be learned.

Sound: A distinction is drawn between verbal sound and non-verbal sound such as music. Sound media are necessary to present a stimulus for recall or sound recognition. Audio narration is recommended for poor readers.

Motion: Models force decisions among still, limited movement, and full

movement visuals. Motion is used to depict human performance so that learners can copy the movement. Several models assert that motion may be unnecessary and provides decision aid questions based upon objectives. Visual media which portray motion are best to show psychomotor or cognitive domain expectations by showing the skill as a model against which students can measure their performance.

Color: Decisions on color display are required if an object's color is relevant to what is being learned.

Realia: Realia are tangible, real objects which are not models and are useful to teach motor and cognitive skills involving unfamiliar objects. Realia are appropriate for use with individuals or groups and may be situation based. Realia may be used to present information realistically but it may be equally important that the presentation corresponds with the way learner's represent information internally.

Instructional Setting: Design should cover whether the materials are to be used in a home or instructional setting and consider the size what is to be learned. Print instruction should be delivered in an individualized mode which allows the learner to set the learning pace. The ability to provide corrective feedback for individual learners is important but any medium can provide corrective feedback by stating the correct answer to allow comparison of the two answers.

Learner Characteristics: Most models consider learner characteristics as media may be differentially effective for different learners. Although research has had limited success in identifying the media most suitable for types of learners several models are based on this method.

Reading ability: Pictures facilitate learning for poor readers who benefit more from speaking than from writing because they understand spoken words; self-directed good readers can control the pace; and print allows easier review.

Categories of Learning Outcomes: Categories ranged from three to eleven and most include some or all of Gagne's (1977) learning categories; intellectual skills, verbal information, motor skills, attitudes, and cognitive strategies. Several models suggest a procedure which categorizes learning outcomes, plans instructional events to teach objectives, identifies the type of stimuli to present events, and media capable of presenting the stimuli.

Events of Instruction: The external events which support internal learning processes are called events of instruction. The events of instruction are planned before selecting the media to present it.

Performance: Many models discuss eliciting performance where the student practices the task which sets the stage for reinforcement. Several models indicate that the elicited performance should be

categorized by type; overt, covert, motor, verbal, constructed, and select. Media should be selected which is best able to elicit these responses and the response frequency. One model advocates a behavioral approach so that media is chosen to elicit responses for practice. To provide feedback about the student's response, an interactive medium might be chosen, but any medium can provide feedback. Learner characteristics such as error proneness and anxiety should influence media selection.

Testing which traditionally is accomplished through print, may be handled by electronic media. Media are better able to assess learners' visual skills than are print media and can be used to assess learner performance in realistic situations.

from "The Distance Learning Technology Resource Guide," by Carla Lane

Kolb - Learning Styles Inventory

by **Saul McLeod** ✉ published 2010

David Kolb published his learning styles model in 1984 from which he developed his learning style inventory. Kolb's experiential learning theory works on two levels: a four stage cycle of learning and four separate learning styles. Much of Kolb's experiential learning theory is concerned with the learner's internal cognitive processes.

Kolb states that learning involves the acquisition of abstract concepts that can be applied flexibly in a range of situations. In Kolb's theory, the impetus for the development of new concepts is provided by new experiences.

"Learning is the process whereby knowledge is created through the transformation of experience" (David A. Kolb, 1984).

Kolb's experiential learning style theory is typically represented by a four stage learning cycle in which the learner 'touches all the bases':

> **1. Concrete Experience** - (a new experience of situation is encountered, or a reinterpretation of existing experience)

> **2. Reflective Observation** (of the new experience. Of particular importance are any inconsistencies between experience and understanding)

> **3. Abstract Conceptualization** (Reflection gives rise to a new idea, or a modification of an existing abstract concept)

> **4. Active Experimentation** (the learner applies them to the world around them to see what results)

Kolb's Learning Cycle

Kolb's learning theory sets out four distinct **learning styles**, which are **based on a four-stage learning cycle**.

Kolb explains that different people naturally prefer a certain single different learning style. Various factors influence a person's preferred style. For example, social environment, educational experiences, or the basic cognitive structure of the individual.

Whatever influences the choice of style, the learning style preference itself is actually the product of two pairs of variables, or two separate 'choices' that we make, which Kolb presented as lines of axis, each with 'conflicting' modes at either end:

feeling

doing ←——→ watching
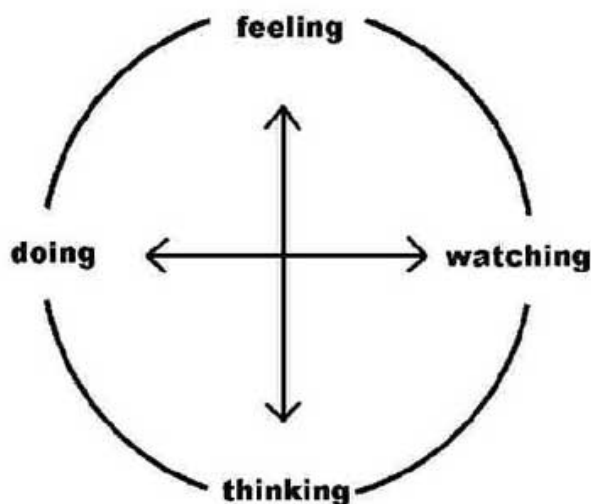
thinking

Concrete Experience - CE (feeling) ----V----Abstract Conceptualization - AC (thinking)

Active Experimentation - AE (doing)-- - V---- Reflective Observation - RO (watching)

A typical presentation of Kolb's two continuums is that the east-west axis is called the **Processing Continuum** (how we approach a task), and the north-south axis is called the **Perception Continuum** (our emotional response, or how we think or feel about it).

Kolb believed that we cannot perform both variables on a single axis at the same time (e.g. think and feel).

Our learning style is a product of these two choice decisions.

It's often easier to see the construction of Kolb's learning styles in terms of a two-by-two matrix. Each learning style represents a combination of two preferred styles. The diagram also highlights Kolb's terminology for the four learning styles; diverging, assimilating, and converging, accommodating:

	Doing (Active Experimentation - AE)	Watching (Reflective Observation - RO)
Feeling (Concrete Experience - CE	**Accommodating (CE/AE)**	**Diverging (CE/RO)**
Thinking (Abstract Conceptualization - AC	**Converging (AC/AE)**	**Assimilating (AC/RO)**

Learning Styles Descriptions

Knowing a person's (and your own) learning style enables learning to be orientated according to the preferred method. That said, everyone responds to and needs the stimulus of all types of learning styles to one extent or another - it's a matter of using emphasis that fits best with the given situation and a person's learning style preferences.

Here are brief descriptions of the four Kolb learning styles:

Diverging (feeling and watching - CE/RO)

These people are able to look at things from different perspectives. They are sensitive.

They prefer to watch rather than do, tending to gather information and use imagination to solve problems.

They are best at viewing concrete situations several different viewpoints.
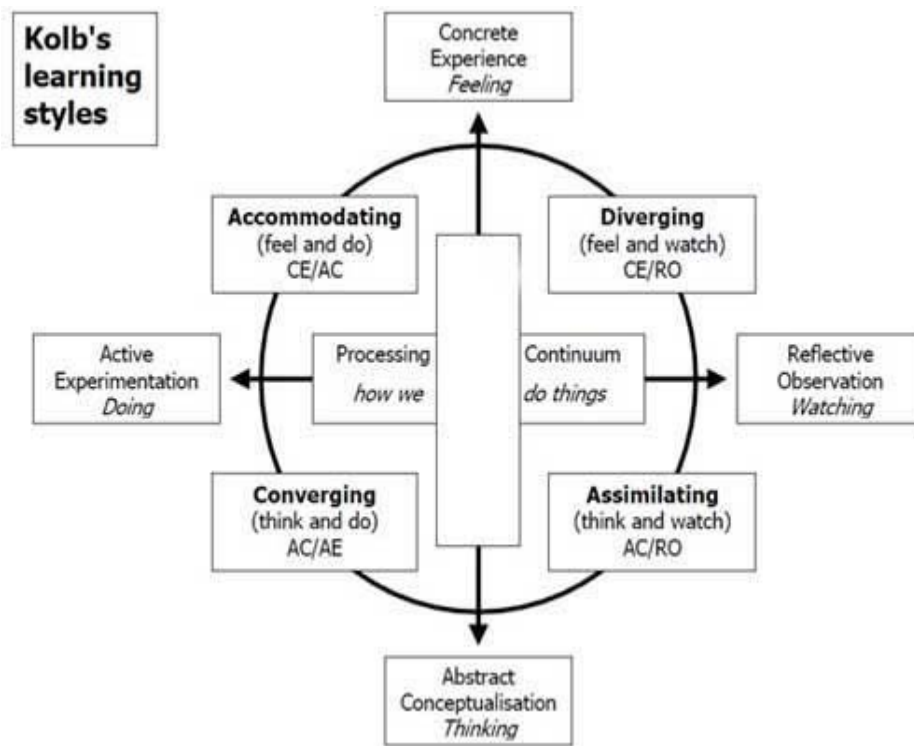
Kolb called this style 'Diverging' because these people perform better in situations that require ideas-generation, for example, brainstorming. People with a Diverging learning style have broad cultural interests and like to gather information. They are interested in people, tend to be imaginative and emotional, and tend to be strong in the arts. People with the Diverging style prefer to work in groups, to listen with an open mind and to receive personal feedback.

Assimilating (watching and thinking - AC/RO)

The Assimilating learning preference is for a concise, logical approach. Ideas and concepts are more important than people. These people require good clear explanation rather than practical opportunity. They excel at understanding wide-ranging information and organizing it a clear logical format. People with an Assimilating learning style are less focused on people and more interested in ideas and abstract concepts. People with this style are more attracted to logically sound theories than approaches based on practical value.

These learning style people is important for effectiveness in information and science careers. In formal learning situations, people with this style prefer readings, lectures, exploring analytical models, and having time to think things through.

Converging (doing and thinking - AC/AE)

People with a Converging learning style can solve problems and will use their learning to find solutions to practical issues. They prefer technical tasks, and are less concerned with people and interpersonal aspects. People with a Converging learning style are best at finding practical uses for ideas and theories. They can solve problems and make decisions by finding solutions to questions and problems.

People with a Converging learning style are more attracted to technical tasks and problems than social or interpersonal issues. A Converging learning style enables specialist and technology abilities. People with a Converging style like to experiment with new ideas, to simulate, and to work with practical applications.

Accommodating (doing and feeling - CE/AE)

The Accommodating learning style is 'hands-on', and relies on intuition rather than logic. These people use other people's analysis, and prefer to take a practical, experiential approach. They are attracted to new challenges and experiences, and to carrying out plans. They commonly act on 'gut' instinct rather than logical analysis. People with an Accommodating learning style will tend to rely on others for information than carry out their own analysis. This learning style is prevalent.

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Overview of Learning Styles
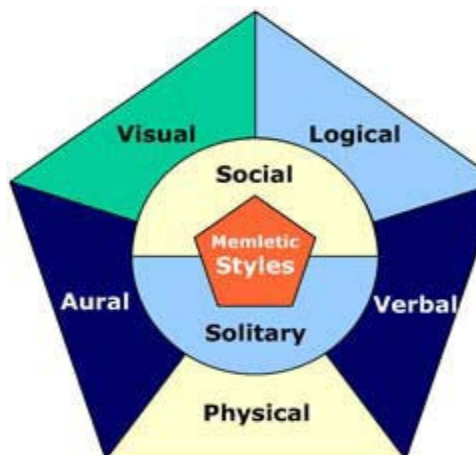
Many people recognize that each person prefers different learning styles and techniques. Learning styles group common ways that people learn. Everyone has a mix of learning styles. Some people may find that they have a dominant style of learning, with far less use of the other styles. Others may find that they use different styles in different circumstances. There is no right mix. Nor are your styles fixed. You can develop ability in less dominant styles, as well as further develop styles that you already use well.

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Using multiple learning styles and "multiple intelligences" for learning is a relatively new approach. This approach is one that educators have only recently started to recognize. Traditional schooling used (and continues to use) mainly linguistic and logical teaching methods. It also uses a limited range of learning and teaching techniques. Many schools still rely on classroom and book-based teaching, much repetition, and pressured exams for reinforcement and review. A result is that we often label those who use these learning styles and techniques as "bright." Those who use less favored learning styles often find themselves in lower classes, with various not-so-complimentary labels and sometimes lower quality teaching. This can create positive and negative spirals that reinforce the belief that one is "smart" or "dumb".

By recognizing and understanding your own learning styles, you can use techniques better suited to you. This improves the speed and quality of your learning.

The Seven Learning Styles

Visual **(spatial):** You prefer using pictures, images, and spatial understanding.

Aural **(auditory-musical):** You prefer using sound and music.

Verbal **(linguistic):** You prefer using words, both in speech and writing.

Physical **(kinesthetic):** You prefer using your body, hands and sense of touch.

Logical **(mathematical):** You prefer using logic, reasoning and systems.

Social **(interpersonal):** You prefer to learn in groups or with other people.

Solitary **(intrapersonal):** You prefer to work alone and use self-study.

Why Learning Styles? Understand the basis of learning styles

Your learning styles have more influence than you may realize. Your preferred styles guide the way you learn. They also change the way you internally represent experiences, the way you recall information, and even the words you choose. We explore more of these features in this chapter.

Research shows us that each learning style uses different parts of the brain. By involving more of the brain during learning, we remember more of what we learn. Researchers using brain-imaging technologies have been able to find out the key areas of the brain responsible for each learning style.

For example:

Visual: The occipital lobes at the back of the brain manage the visual sense. Both the occipital and parietal lobes manage spatial orientation.

Aural: The temporal lobes handle aural content. The right temporal lobe is especially important for music.

Verbal: The temporal and frontal lobes, especially two specialized areas called Brocaï¿½s and Wernickeï¿½s areas (in the left hemisphere of these two lobes).

Physical: The cerebellum and the motor cortex (at the back of the frontal lobe) handle much of our physical movement.

Logical: The parietal lobes, especially the left side, drive our logical thinking.

Social: The frontal and temporal lobes handle much of our social activities. The limbic system (not shown apart from the hippocampus) also influences both the social and solitary styles. The limbic system has a lot to do with emotions, moods and aggression.

Solitary: The frontal and parietal lobes, and the limbic system, are also active with this style.